ALPHA AIDS

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Easton, Pa.
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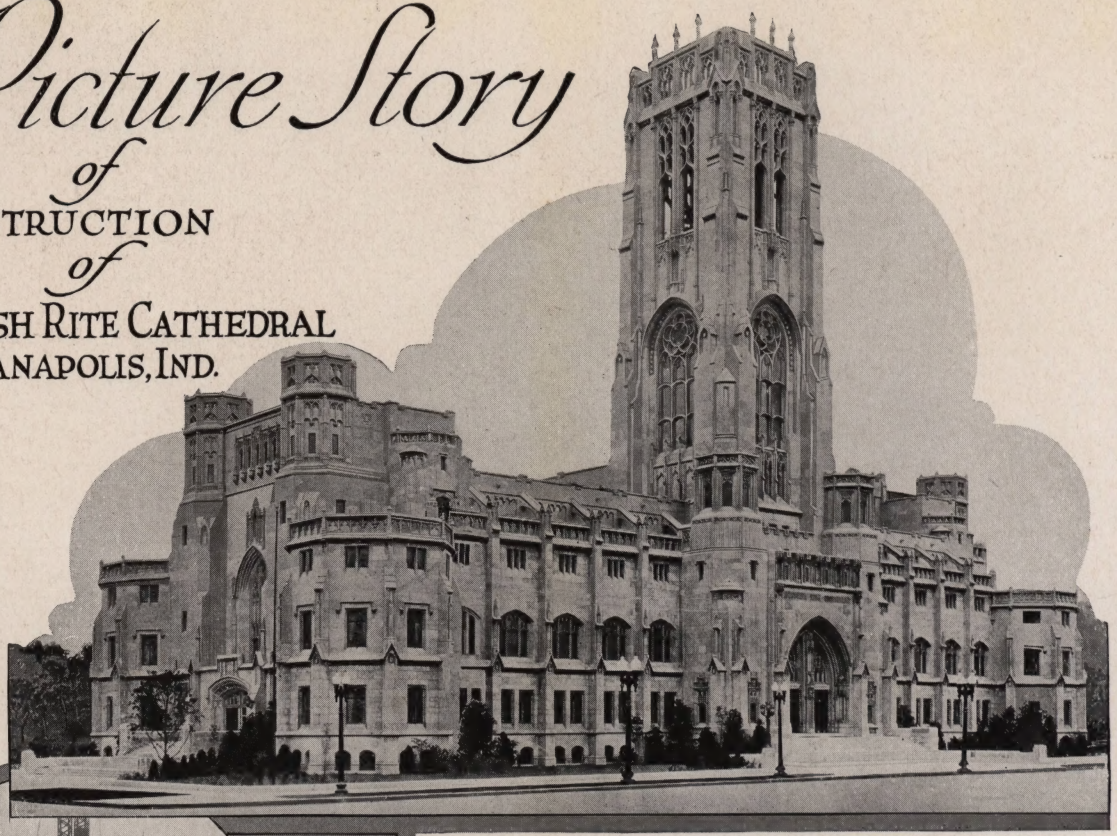
IN THIS ISSUE

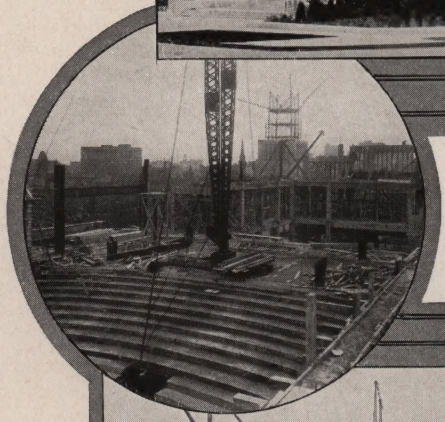
Picture Story of Construction of Scottish Rite Cathedral Indianapolis, Ind.



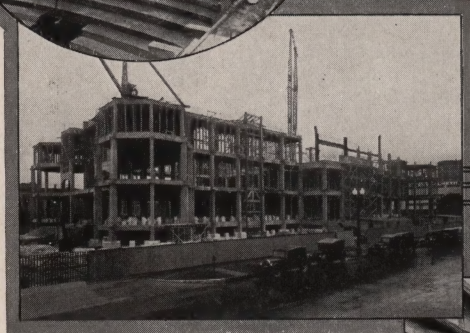
The finished structure—beautiful, impressive, permanent

ON this page are shown construction views and a picture of the completed Scottish Rite Cathedral which was started on May 1, 1927, and completed May 15, 1929. The work continued through two winters.

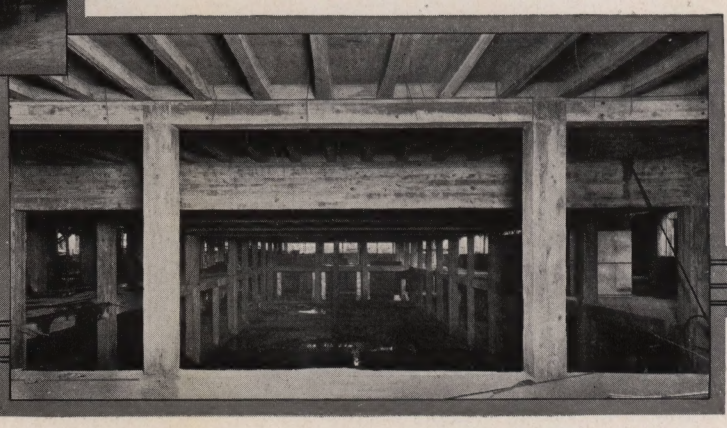
This beautiful architectural structure was designed by George F. Schreiber, architect, Indianapolis, Ind. The Hunkin-Conkey Construction Company, Cleveland, Ohio, were the contractors and the Allied Coal & Material Company, Indianapolis, furnished 25,000 barrels of ALPHA CEMENT. Bedford stone used as exterior finish.



View shows concrete steps for seating arrangement in amphitheatre on third floor (*Nov. 11, 1927*)



Progress of construction work (*Nov. 4, 1927*)



View of basement (*Sept. 28, 1927*)

High School boys built this sidewalk, 300 ft. long, 5½ ft wide, 5 in. thick, in less than three weeks. Total cost $233.99 – about 14-cents per sq. ft.

Divided into three gangs working in rotation on different parts of the job the boys gained a general knowledge of the whole operation.

HIGH SCHOOL BOYS BUILD CONCRETE WALK

WHAT boys of high school age can do in building a concrete walk has been demonstrated by fifty high school pupils at Bellefonte, Pennsylvania. They built in less than three weeks a stretch of walk 300 feet long and 5½ feet wide, having a thickness of 5 inches. The total cost to the Board of Education was $233.99, or about 14 cents a square foot.

The first thing done was to pick out three boys as gang foremen or leaders. They had definite things to do. Gang leader No. 1 was to take charge of the excavating and refilling with cinders; No. 2 cared for building the mixing box, mixing the cement and seeing to it that the right proportions were used and the batch properly mixed; No. 3 superintended building the forms and pouring the concrete. Each leader had enough boys to do the work. He had to direct the work according to the instructions of the teacher, H. C. Menold. This arrangement gave the leaders much responsibility and resulted in speedy work.

The second thing to do was to get the right grade and obtain the approval of the City Engineer. When the gang leader took his six or eight boys out to stretch his grade line, he excavated a trench 5½ feet wide and 16 inches below grade, refilling with 12 inches of cinders, well tamped. When enough excavation work had been done, the leader of gang No. 2 came with his boys and began to build forms out of 2 x 4's. At the same time No. 3 put his boys to work on the mixing box. By the time that gang leader No. 2 had enough forms ready for the cement, gang leader No. 3 had finished the mixing box.

The first gang kept on digging and were able to excavate and refill with cinders as fast as the other boys could mix materials and fill the forms. In order that the boys might gain a general knowledge of the operations, they were shifted from one job to another. Each boy was required to bring something from home to help with the work, such as a hoe, pick, shovel or wheelbarrow.

Fifty boys shared in the work. All of them did not work at one time, but Mr. Menold managed to have an average of fifteen boys on a shift. It took eleven days to finish the work. Later, some of the boys built concrete walks at their homes. They also helped in the building of a concrete community swimming pool during their summer vacation.

THE youth of the present day may not have any greater zest for "building things" than the youth of former periods. But he has better tools and more facilities for learning. The schools are giving him much that he can apply practically. And there are magazines and books galore, giving him the "how" of almost any undertaking that may appeal to him.

Let producers of building material, contractors, building-material dealers and property-owners look out for the views and needs of the new generation. It is well to remember that there are today in America something like 35,000,000 young people under twenty-one years of age.

THE MERCHANDISE MART,

The Merchandise Mart, Chicago, Ill. Architect: Graham, Anderson, Probst & White, Chicago, Ill. (Magnus Gundersen, Chief Structural Engineer) Contractor: John Griffiths & Son Co., Chicago, Ill. (Bruce Gordon, General Superintendent)

THE conception of the Merchandise Mart, Chicago, Ill., illustrated here and on the cover page of this magazine, was brought about by the necessity of meeting the changed marketing requirements of this modern era. One of the most important changes is the demand for the concentration of kindred markets in an advantageous location so as to conserve time spent in buying of goods and to correspondingly increase time for selling. And, modern competition demands the lowering of distribution costs to give greater effect to the savings already achieved by lowering production costs.

It provides a common meeting place for retail buyers and wholesalers. The buyer will come to a great central market, an international exposition of merchandise. Every convenience is provided for the buyer except a place to sleep. Restaurants, barber shop, drug store, branch post-office, a bank and telegraph offices will economize his time.

This building, the largest in the world, is a $40,000,000 project. It is the first structure of its kind to be erected wholly in air rights. The utilization of railway air rights by agreement with the Chicago and North Western Railway Company for building construction in a terminal area marks a new era in commercial and civic development in this country, typifying an age of increased efficiency through consolidation and concentration. The railroad tracks, including two tracks for the exclusive use of the building, run on the first level beneath the building. No other building has such facilities for receiving and shipping merchandise. The entire ground level below the street floor is, in effect, a modern freight station. Private tracks for incoming carload freight extend under the center of the building. A dock for vessels and lighters connects with the freight elevators of the building.

Graham, Anderson, Probst & White, Chicago, Ill., one of the leading firms of architects and engineers in the country, designed this colossal structure and Magnus Gundersen was Chief Structural Engineer. One of America's best known construction concerns, John Griffiths & Son Co., Chicago, Ill., was the builder. And, we are proud of the part ALPHA PORTLAND CEMENT played . . . . . about 140,000 barrels used in the superstructure.

Some idea of the magnitude of this huge building may be gained in knowing that its outside base dimension is 296 feet on Franklin Street, 328 feet on Wells Street, 573 feet on the north bank of the Chicago River and 724 feet on Kinzie Street. It is set back from the river one hundred feet to accommodate the broad upper-level North Bank Drive which according to the Plan of Chicago is to be the counterpart of Wacker Drive on the south bank.

The main building is eighteen stories high, with a six-story tower, or a total of twenty-four stories. It contains approximately 4,000,000 square feet . . . . . about 100 acres . . . . . of floor space. It contains spacious corridors, veritable business streets, extending for more than 650 feet on each floor. To duplicate the floor space in The Merchandise Mart, a skyscraper two hundred stories high on a ground plot 125 feet by 150 feet would be required. One floor of The Merchandise Mart contains an area equal to the total floor space available in a 10-story building of the average Chicago skyscraper ground dimensions.

In erecting this masterpiece of construction, over 2500 men, members of all the building crafts, were employed in day and night shifts. This is the greatest number of men ever used at any time on a building project in the United States. Ground was broken in August, 1928, and the building was completed

THE WORLD'S LARGEST BUILDING

Aerial view shows comparative size. (Photo by Chicago Aerial Survey Co.)

and ready for occupancy in May, 1930. During this building period the full range of weather conditions was encountered.

The front cover illustration shows the progress of the structure on November 21, 1929, when the temperature was hovering around the freezing point and at times was below zero. By inclosing an entire floor with tarpaulins and by observing other cold-weather precautions, the pouring of concrete continued regardless of the lowness of the temperature.

John Griffiths & Son Co., the contractor, because of the magnitude of the job, planned the work so as to make use of the latest developments in equipment and probably used the greatest assortment ever assembled on one building operation. Approximately sixty carloads of material were received daily. Because of the railroad tracks underneath the structure, it was possible to deliver the cars at any point on the construction site. Railroad cranes unloaded the great steel beams, and nine gigantic guy derricks, always on the top level of the rising building, hoisted them to their positions. The heaviest steel girders weighed twenty tons each.

Fifty-five belt and bucket conveyors were used in varying combinations to distribute the wet concrete and dry aggregates. Cement in bulk was shot or blown by compressed air from cars to a 5800-barrel bin seventy-five feet above the ground. Sand and stone were elevated from cars to another bin, where the materials were fed by gravity into the mixer. After mixing, the concrete was distributed throughout the building over the series of endless conveyors, thus eliminating wheelbarrowing and all man-handling. The application of this conveyor system was the result of plans made by Bruce Gordon, general superintendent in charge for John Griffiths & Son Co., and is said to be one of the outstanding engineering achievements in recent years. Two central mixing plants, one located near the center of the building and the other near the middle of the river side on the outside of the building, were used. If the more commonly used method of distribution of concrete by buggies had been employed, it would have been necessary to choose between long lines of buggies or a greater number of concrete mixers and elevating towers. Either choice would have resulted in much interference between concreting equipment and gangs and workmen of other trades. The method of distribution by belt and bucket conveyors resulted not only in eliminating much interference but it reduced labor costs.

In the physical structure of The Merchandise Mart are represented the following huge quantities of materials and equipment:

51,300 tons of steel, including columns, beams and girders.

458 caissons from 5 to 10 feet in diameter driven down to bed rock, an average depth of 70 feet below city datum, requiring 50,000 cubic yards of concrete. Put end to end those caissons would make a column about eight miles long.

200,000 cubic feet of stone.

29,000,000 brick.

5500 windows requiring 132,000 square feet of glass.

30,000 lighting fixtures, with 2,000,000 feet or 380 miles of wire weighing 60 tons.

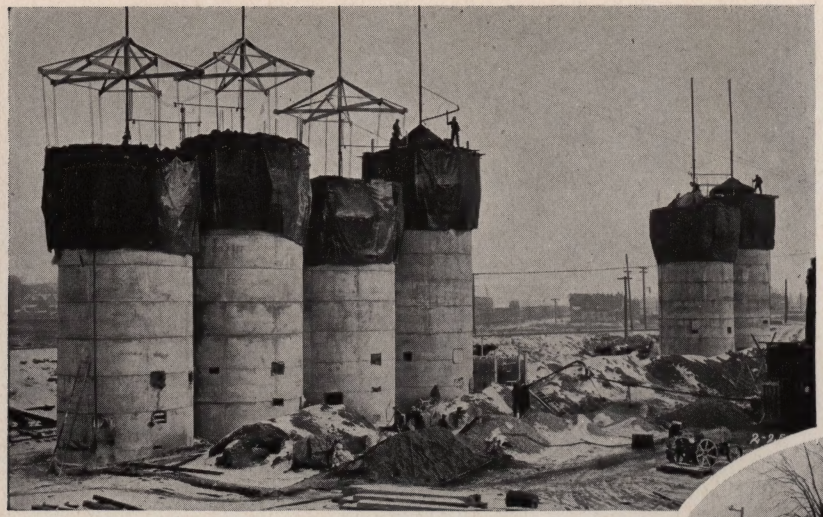
15 passenger elevators traveling 500 miles a day.

14 freight elevators with a single trip total capacity of 104,000 tons.

5,000,000 feet of lumber.

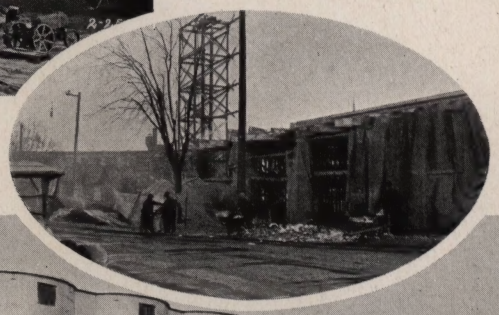
9,504,000 square feet of steel wire reinforcement for floors, enough for a 100-mile highway eighteen feet wide.

(*Concluded on page 7*)



DON'T HIBERNATE DURING *the* WINTER MONTHS

(Oval) Western Printing & Lithographing Company. View shows sand being heated and the work protected by tarpaulins as precaution against sudden drop of temperature



Winter construction view of concrete coal silos for Churchell Coal Co., Inc., Syracuse, N. Y., built by Craine, Inc., Norwich, N. Y.

Battery of eight concrete coal silos of Churchell Coal Co., Inc., Syracuse, N. Y. Built during winter of 1928-1929

WHEN winter comes building operations, as a rule, are largely suspended. In the north it is cold; in the south it is warm. Temperature appears to have little to do with it.

Naturally, customs and traditions have roots. When the building industry was young, winter work was difficult. Since those days we have progressed considerably. We know how to battle cold, how to protect the worker, have equipment equal to the severest climatic conditions and, as a result, can build as well in winter as in summer.

A few years ago builders were afraid to use concrete during the cold months. They knew that the essential water was subject to freezing before and after mixing and that the green concrete itself might freeze, later to thaw out with possibly disastrous results. However, with a few simple precautions, concrete is now placed with complete assurance of permanence and satisfaction, no matter what the weather.

The illustration on the front cover page of this issue is of The Merchandise Mart, Chicago, Ill., which is the largest building in the world. Ground for the building was broken in August, 1928, and the building was completed in May, 1930. The cover picture was taken on November 21, 1929, when the temperature was around the freezing point and at times well below it. The view shows how an entire floor was carefully enclosed with tarpaulins, so that the contractor could continue with the pouring of concrete regardless of the cold weather.

Views on this page show a battery of eight concrete coal silos constructed for the Churchell Coal Co., Inc., at Syracuse, N. Y., by Craine, Inc., of Norwich, N. Y., during the winter of 1928–1929. The construction view was taken February 25, 1929. The silos are 20 feet in diameter, 65 feet high and, of course, ALPHA CEMENT was used.

The other illustrations are of an addition to the plant of the Western Printing & Lithographing Company, Racine, Wis. The original plant was built several years ago, in which approximately 12,000 barrels of ALPHA CEMENT were used. The two-story reinforced concrete addition to the main plant, required about 6000 barrels of ALPHA and makes available 64,000 square feet more floor space. The plans and specifications for the addition were prepared by The Austin Company of Chicago. The work was done by the plant crew of the Western Printing & Lithographing Company, with Elmer Voight, superintendent of the plant, as supervisor, H. Peterson in charge of construction, and W. Sorenson in charge of mixing and placing of concrete and of labor. ALPHA CEMENT was furnished by J. H. Haumersen & Sons, Racine, Wis.

ALPHA CEMENT from the LaSalle, Illinois, plant was used in the addition to the building of the Western Printing & Lithographing Company. T. H. Huling, our LaSalle Plant Engineer, visited the work while in progress and has given us the following information on this cold-weather job:

The first story of the addition was slightly above the ground

HERE'S HELPFUL INFORMATION ON COLD-WEATHER CONSTRUCTION

(Oval) Western Printing & Lithographing Company. View illustrates paper stuffed in openings and use of tarpaulins in case of freezing weather

Heater in use on concrete mixer in building addition to plant of Western Printing & Lithographing Company

Addition to plant of Western Printing & Lithographing Company, Racine, Wis. Plans and specifications prepared by The Austin Company, Chicago, Ill.

level on a fill and the second floor, 14 feet above, was of reinforced concrete, with a slab thickness of 9 inches between columns and a combined floor and beam depth of 14 inches over the columns. The floor was designed for a live load of 250 lbs. per square foot. At the time of the visit, the footings for the columns and side wall foundations were poured up to the ground level. The forms for the second floor were about 85 per cent completed. The shorings supporting the second floor forms were of the adjustable steel pipe type resting on 3-inch by 8-inch planks, four to six feet long.

At this stage of the construction work a problem arose as to the use of a special cement or to follow methods proved by experience to obtain high early strength concrete. High early strength concrete reduces the time during which concrete must be protected and depends upon the quality and condition of the materials used; minimum quantity of mixing water per bag of cement; full time of mixing; proper placing of the concrete and proper curing. After going over thoroughly the information contained in the ALPHA literature on how to obtain high early strength concrete with standard ALPHA CEMENT, the work was continued with ALPHA.

It was decided to use a water-cement ratio of $4\frac{1}{2}$ gallons of water per bag of cement, no determination being made of the moisture in the sand and crushed stone. A mix of $1:2:2\frac{1}{2}$ gave the right plasticity. The mixing time was $1\frac{1}{4}$ minutes, which was about as long as they could mix each batch without keeping the men waiting. The sand was heated, as shown in one of the illustrations here, and a kerosene blow torch was mounted on the mixer, which is shown rather indistinctly in the illustration. All water was heated and the temperature of the concrete when placed was 79 degrees, while the temperature of the weather was 40 degrees. No anti-freeze solution was added.

These examples of cold weather construction are typical of similar jobs which are lengthening the building season to the entire twelve months. The practical points to follow in doing concrete work in cold weather are as follows:

The temperature of the concrete should not be below a certain minimum (about 40 degrees F.) or the hardening process will not start properly nor will it continue at a normal rate.

Green concrete subjected to repeated freezing and thawing will not harden properly.

Fresh concrete frozen once may gain its normal strength but there is a strong presumption that it will not.

During the early stages of hardening, moisture is necessary and care should be taken to prevent drying out.

It is inadvisable to subject green concrete to freezing temperature before it has attained more than one-fourth of its final strength.

There is nothing mysterious about successful cold weather concreting—it is simply a matter of keeping the concrete warm and moist. Any method of accomplishing this will produce satisfactory results.

New Styles in Shop Architecture Through-the-Medium of Portland Cement

Photos from Ewing Galloway, NY

A Relief from the Square Front Style of Mercantile Building (above)

An Exceptionally Unorthodox Store Building (above)

Alluring Shops of Spanish Design (at right)

THE new style of shop architecture illustrated on this page, rapidly gaining favor in Southern California, especially in the region of Los Angeles and Santa Barbara, outside of the congested downtown retail districts, may revolutionize retail store fronts generally.

While some of the Spanish designs are rather ornamental for a private residence, their attractiveness and distinctiveness have an appeal and charm to retail buyers.

The beauty inherent in concrete has long lain dormant, awaiting only the genius of the designing mind to reveal it. Concrete is an artistic medium, both facile and durable. It affords a freedom of design—exercising no restraint on the architect. Architects have come to realize the architectural beauty existing in concrete. It is a plastic material, which the architect or designer will find pliable in his hands to meet his ideas of beauty and symmetry.

As a building material, portland cement concrete is second to none. It can be molded or carved, stained or colored, and given any texture desired. Because it possesses structural strength, natural resistance to fire and water, and decorative possibilities, concrete may be classed as a complete building material.

The three store buildings of Spanish design may suggest to those planning new developments, especially in the designing of retail stores, avenues of architectural design that will harmonize with the development as a whole and add, at the same time, charm and beauty. Not only is an out-of-the-ordinary designed building an asset to the community but the merchant, in face of present-day competitive conditions, finds it highly necessary to have his store front and windows modern and attention-attracting so as to influence all possible buyers to enter his place of business.

CEMENT BLOCK CONSTRUCTION

FROM DUCKS TO GROCERIES

THE initial cost of cement block masonry is usually but little more than for much less permanent construction. True construction economy involves more than the first cost of the structure. It takes into consideration such items as the rate

of depreciation and the expenditures necessary to keep the building in good repair. In this respect cement block construction effects an appreciable saving to the owner. The long life of practically maintenance-free service that is possible with cement block masonry makes it an economical type of construction.

Swift Stream Farms, Inc., at Moriches, New York (one of the largest duck farms on Long Island), is gradually replacing old frame buildings with cement masonry structures, one building being of especial interest —the picking and packing house. This building is built on a slope behind the retail sales building on Merrick Road. The live ducks are driven to the killing pen which corresponds to the upper story of the building; after killing they are passed to the pickers who remove feathers; ducks are then placed in a cooling tank and later chuted to the lower or street level where the refrigerator plant is located.

Mr. J. S. Robert, partner of J. A. Titmus in the Swift Stream Farms, Inc., was so well pleased with the advantages of building with cement blocks, that he insisted upon block-stucco construction in his new A. & P. building in Center Moriches, which was erected in 1929 of Mastic Blox made by the Mastic Cement Block Works, Mastic, N. Y. The building erected from plans by Lewis Inglee, architect, Amityville, New York, is 90 feet deep, 20 feet wide and 24 feet high and required 5000 cement blocks. Wm. H. Chapman & Son, East Moriches, New York, furnished ALPHA CEMENT for the blocks manufactured by the Mastic Cement Block Works.

The many characteristics which make cement block masonry a superior building material have evoked praise from those who have used the units. No matter what the size or character of the building, whether it be an improvement on a farm, a store building, a dwelling or a structure with proportions limited only by design and convenience, cement block masonry is an ideal construction material. Common hazards of fire or storm and the inroads of time and weather lose their menace for structures built of cement blocks.

(*Concluded from page 3*)

142 miles of piping for the sprinkler system.

32½ miles of piping for the steam heat system.

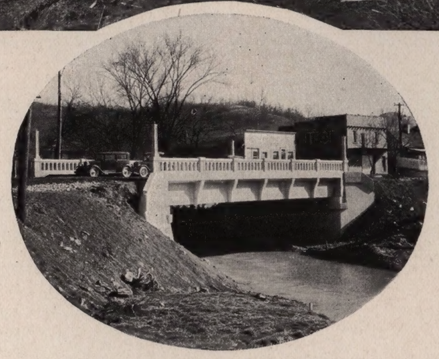
40 miles of plumbing piping.

To heat the Mart 204 tons of coal will be burned each day in cold weather to produce 2,880,000 pounds of steam. 2,000,000 cubic feet of fresh air per minute will be forced through the building by fans and radiators, enough to furnish air for a quarter of a million people.

The world's largest mercantile building . . . . . The Merchandise Mart . . . . . a gigantic wholesale dry goods market, serving retail merchants in thousands of trade centers throughout agricultural America is truly a monument to the nation's business, architectural, engineering and building skill and enterprise.

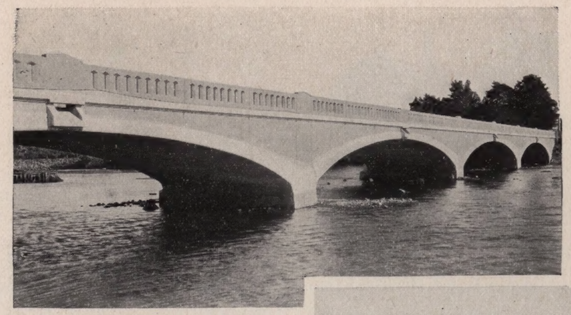
ALPHA CEMENT BRIDGES OF STRENGTH, DURABILITY, ECONOMY AND ATTRACTIVENESS

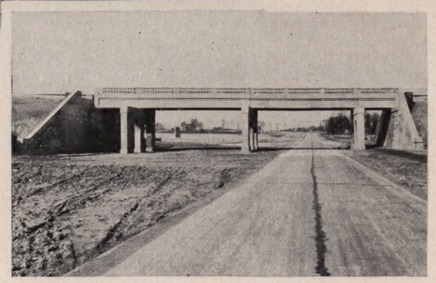
(Above) Memorial Bridge, near Freeburg, Ill. B. C. McCurdy, Belleville, Ill., Engineer of Design and Construction; David O. Thomas, County Superintendent of Highways (deceased); George Hoelscher, Smithton, Ill., contractor



(Above) Stone Coal Bridge, a state bridge, Weston, W. Va. Built by R. Giaviana, Davis, W. Va. ALPHA CEMENT furnished by Heater-Bond Lumber Co., Weston, W. Va.

(Below) ALPHA CEMENT bridge at Caughdenoy, N. Y. Contractor, Roberts Supply Co., Lima, Ohio





(Right) Wabash Railway Company's bridge over Kingshighway, N. W. Boulevard between Baden and Jennings, St. Louis County, Mo. Bridge 120 feet long, two center spans for 40-foot roadways and two end spans for 10-foot sidewalks. Bridge Engineer, C. S. Johnson, Wabash Railway Company. Contractor, Hannan & Everett Construction Co., Boatmen's Bank Building, St. Louis, Mo.

ALPHA CEMENT concrete, as shown by the illustrations here, lends itself not only to the true expression of engineering skill, ingenuity and utility but also as a medium of expression of artistic beauty. A bridge must have grace of line and form, as well as strength, durability and economy.

The following interesting details on the construction of the Memorial Bridge, near Freeburg, Illinois (see illustration in upper left corner), are given by B. C. McCurdy, County Superintendent of Highways, St. Clair County, Belleville, Illinois, who was the engineer of design and construction of the Memorial Bridge and who succeeded the late David O. Thomas, who was County Superintendent of Highways at the time the bridge was built:

"The Memorial Bridge was constructed by the County of St. Clair as Section 50B-15d, State Aid Route No. 47, and was dedicated to those men from Freeburg and Fayetteville Townships who lost their lives in service during the World War. This structure has a center span of 100 feet flanked by 70-foot spans. The roadway of the bridge is 20 feet in the clear. The design is a double cantilever, the 100-foot span being divided in the middle and the girders being cantilevered for a distance of 30 feet behind the abutment to form an approach span. The wing walls of the abutments are camouflage. The girders are pivoted on the abutments and work freely on cast steel rockers placed in the piers, there being a cast iron finger casting used as a roadway expansion device. This bridge is founded on solid rock which is about 36 feet below roadway grade across the stream bed.

"The design proved very economical under the conditions imposed upon it. The finished work included 1215 cubic yards of concrete and 100 tons of steel. Stresses of 16,000 lbs. in reinforcing steel and 1000 lbs. in concrete and girders were used. Test cylinders were taken from the various portions of the girders and were broken in a compression machine before false work was struck. These cylinders showed ample strength at an age of fourteen days under average weather conditions."

The best location, opening necessary beneath, traffic load and many other things must be taken into consideration when the design of a bridge is contemplated as they will influence the ultimate structural plan.

Of course, the selection of a site or location for a bridge should be given careful thought. While the site is sometimes fixed at one definite point by the typography of the country or the location of the roadway, in many cases where new roads are to be located and large streams are to be crossed, the selection of the site must be given careful thought.

In the case of the ordinary highway bridge, the designer should be furnished with complete knowledge of the drainage area and the fall in feet per mile for some distance above and below the bridge location. This information will influence the necessary size and shape of the water-way opening, and, naturally, the design of the bridge.

In the selection of the site, a careful study of the character of the soil supporting the abutments and piers is important, for upon this depends the stability of the structure. No matter how carefully the superstructure may be designed and built, weak foundations may cause failure.

Increase in the volume of traffic and the greater number of vehicles of heavier tonnage has demanded that roadways of new bridges be made wider than in the past. Some new bridges are so designed that the road surface may be widened when necessary without changes in the substructure.

The question of live loads for which a highway bridge should be designed gives use to considerable speculation. The weight and carrying capacity of vehicles have increased from five to more than twenty tons. With the use of trailers in connection with trucks, the highway bridge becomes comparable to the problem of the railroad bridge with its series of moving loads.

Helpful literature on the construction and design of concrete bridges will be furnished upon request to those interested.

(Above) Fort Saint Peter Bridge over Yazoo River at Redwood, Miss., twelve miles above Vicksburg, Miss. Meyer Greenwald Construction Company, Monroe, La., contractors. ALPHA CEMENT furnished by the Perry Lumber Company, Vicksburg, Miss.

(Above) Bridge over Fox River, St. Charles, Ill. Charles Lamb, engineer, St. Charles, Ill. and Miles Lamb, inspector, St. Charles, Ill. Oltendorf Construction Company, contractors, Palatine, Ill. ALPHA CEMENT furnished by Harold C. Harbaugh, St. Charles, Ill. An interesting test of the six-inch by six-inch concrete beams, 1:1½:2½ mix, with a two-minute mixing time, on the last arch of the bridge, broken after three days, gave an extreme fibre stress (modulus of ruptures) on four breaks of 700 lb. average

(Below) Tennessee Highway Bridge over Green River, Wayne County, Tenn. Built by Ed. Hardy & Son, Pulaski, Tenn. ALPHA CEMENT furnished by Harwell & Fitzgerald, Pulaski, Tenn.

(Left) Schuylkill County Bridge, Pine Grove, Pa. Contractor, Edward Rahrig, Zion Grove, Pa. ALPHA CEMENT furnished by Charles Werner & Co., Pine Grove, Pa.

(Above) Paved barnyards save manure. They can be kept free of mud and filth in all seasons of the year which greatly aids in keeping the animals clean and healthy

(Left) This concrete manure pit is located at the rear end of the barn. It is handy in removing manure from the barn and is accessible on all sides for loading the spreader

IS YOUR MANURE PILE REAPING DOLLARS?

GOOD farm practice demands that farmers take advantage of every opportunity to make each acre produce its greatest possible yield. Manure contains a large amount of plant food in the form of nitrogen, phosphorus and potash. This plant food has a definite money value based on its cost when purchased in the form of commercial fertilizer. Its value may also be determined by the increased crop yield resulting from its application to the soil. The Pennsylvania Experiment Station recently determined the value of manure as follows:

TABLE A
Value of Manure Produced by Livestock

Type of Animal	Tons Saved in One Year	Value per Ton	Value for One Year
Horse	5.2	$4.07	$21.16
Dairy Cow	8.5	3.24	27.54
Other Cattle	4.0	3.88	15.52
Sheep	0.4	7.89	3.15
Hog	0.6	5.43	3.25

Results from several other experiment stations are in accord with the above figures and substantiate the fact that mixed manure is worth at least $4.00 per ton. In addition to the plant food, manure furnishes soil organic matter which gives it extra value. Organic matter makes plant food already in the soil more available, supplies food for beneficial soil bacteria, prevents washing and blowing, and increases the water-holding capacity of the soil.

Loss of fertilizing elements in manure results from (*a*) failure to save liquid contents; (*b*) fermentation; (*c*) leaching (washing out of valuable plant food). Leaky or absorbent barn floors and unpaved feed lots for barnyards allow the greater portion of liquids to escape immediately. Pound for pound, the liquid content is worth more than the solid and the greatest single item of loss in the manure is from loss of liquid contents.

Frequently farm work or other conditions makes it impossible to haul manure out and spread it on the fields daily. A concrete manure pit is the best means of properly storing the manure until it is used. The watertight walls and floor of the pit prevent the loss of the valuable liquid contents and enable control of moisture and decomposition or rotting, that keep loss of fertilizing elements at a minimum.

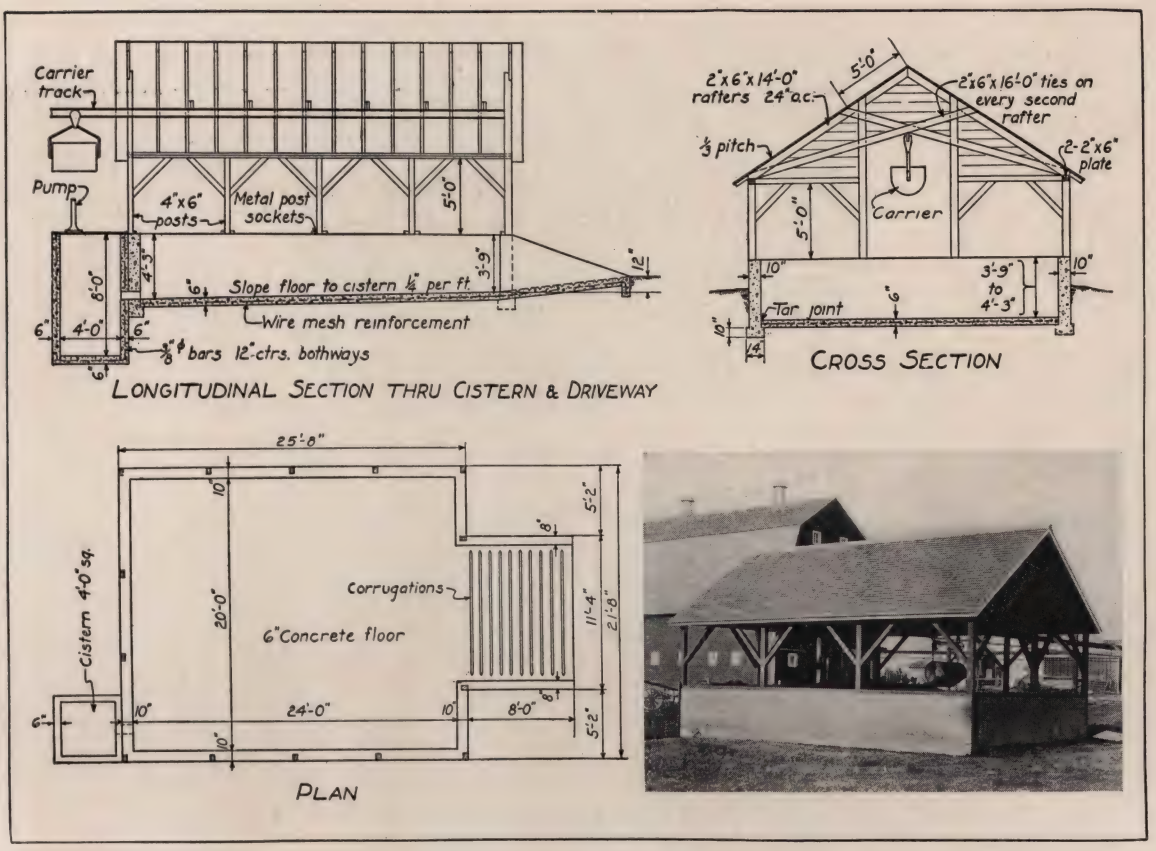
Manure pits, as far as concrete construction goes, are built a good deal the same as concrete tanks. Sanitation is improved by having the pit some distance from the barn. Although not absolutely necessary it is desirable to roof the pit, as excess water due to rainfall is thus prevented from accumulating in the pit.

The location of the pit should be such that it will be handy for filling or emptying. A small pit may often be placed so that the spreader can be driven on either side thus requiring no driveway. In the larger sizes a driveway should be provided so that the spreader may be backed into the pit. For very long pits, it is a good plan to build a driveway at each end so that the spreader may be driven entirely through the pit.

The following table gives the approximate dimensions of pits required for dairy herds of different sizes:

TABLE B
Dimensions of Manure Pits Required for Dairy Herds

No. of Cows	Length	Width	Average Depth
10	16 Ft.	16 Ft.	4 Ft.
20	24 "	20 "	4 "
30	30 "	24 "	4 "
40	40 "	24 "	4 "



Suggested design for a concrete manure pit having capacity for 20 cows. Valuable fertilizing elements of manure are not washed out by rains

As it is usually not practicable to use enough bedding in stalls to absorb all liquids, a cistern should be built near the pit to hold the unabsorbed portions. From this cistern the liquid may be pumped into a tank wagon for distribution or may be pumped over the manure in the pit to keep it moist. This replaces the moisture lost by evaporation. Cattle or hogs are frequently allowed access to the pit and they tramp the contents so compactly that there is little, if any, loss due to fermentation.

The cistern may be either rectangular or round, the former type being the easiest to build. The walls should be 6 inches thick. Concrete for the walls and bottom is placed in one operation to eliminate joints. This may be done by suspending the inside wall form in place before starting concreting. Reinforcement for the cistern should consist of $^3/_8$-inch rods spaced 12 inches on centers in both directions of the floor and wall.

The concrete mixture for the cistern should contain not more than $5^1/_2$ gallons of water per sack of cement when the aggregates are thoroughly dry. If aggregates are moist the amount of water should be reduced to $4^1/_4$ gallons per sack and if dripping wet only $3^3/_4$ gallons should be added. A proportion of 1 sack of Alpha Cement to 2 cubic feet of sand and 3 cubic feet of crushed stone or other coarse aggregate (1:2:3) will ordinarily produce concrete of the correct workability for the cistern. If this mixture is too wet add more sand and coarse aggregate and if too dry add less sand and coarse aggregate in the next batch. Under no condition change the amount of mixing water specified.

The concrete mixture for the manure pit should not contain more than $6^1/_2$ gallons of water per sack of cement when aggregates are thoroughly dry, 5 gallons per sack if moist and $4^1/_4$ gallons if dripping wet. The proportion of 1 sack Alpha Cement to $2^1/_2$ cubic feet of sand and $3^1/_2$ cubic feet stone or pebbles ($1:2^1/_2:3^1/_2$) will usually be found suitable. If not, the same corrections in amount of sand and coarse aggregate used, as described above, may be made.

The floor of the pit is placed first, sloping it slightly toward the cistern. A $^1/_2$-inch space should be left around the edges of the floor which is later filled with tar to make a watertight joint between the floor and walls. Reinforcement for the floor and walls is the same as for the cistern—$^3/_8$-inch rods spaced 12 inches on centers.

Success in the use of concrete follows the observation of a few simple directions. The sand should be clean and well-graded, that is, particles should range in size from fine up to those that will just pass a screen of $^1/_4$-inch mesh. Pebbles or crushed stone should be clean, hard, and range in size from $^1/_4$-inch up to 1-inch for cisterns, and up to $1^1/_2$-inches for manure pits. For economy in concrete, all materials must be measured accurately. Sand and pebbles or crushed stone should be measured separately. Most bank-run gravel contains too much sand and it should be screened and the sand and pebbles reproportioned before using.

Clean water is essential. Under no conditions should the amount specified for the work be changed. Corrections in workability of the concrete mixture must be made with the aggregate.

The concrete must be mixed thoroughly either by hand or by machine. It should be placed immediately, spading it well against the form faces to produce a dense, watertight wall.

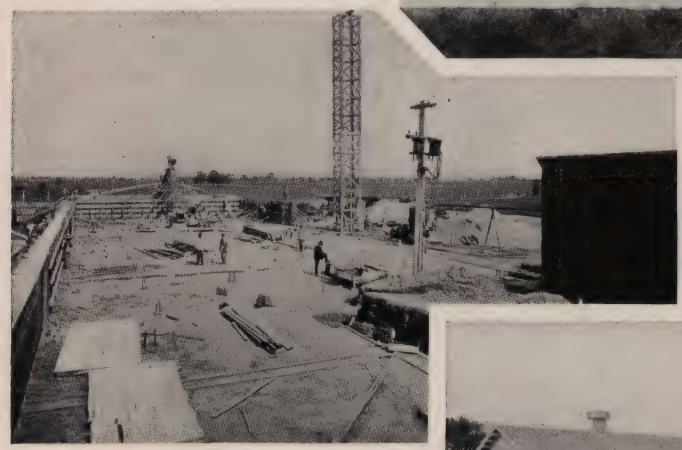
Concrete requires moisture to develop its full strength and for this reason new concrete must be protected from the sun and wind so that it will not dry out or lose surface moisture. Finished work may be protected by a covering of canvas, straw, or similar material and kept moist by frequent sprinkling for a period of ten days before using.

While a concrete manure pit and cistern are necessary in retaining the fertilizing value of manure, in order to effect a complete saving, dairy barn floors and barnyards should be of concrete. They are sanitary and easy to keep clean and make it possible to save the valuable liquid part of the manure.

ALPHA CEMENT at LONDON, OHIO

Entrance to Prison Farm, showing concrete road and concrete posts ~ at right ~

Construction work on one of the dormitory buildings. Footers and concrete walls in place ~ below ~



Hog house, illustrating use of concrete for economy and increased convenience ~ at right ~

Concrete floor of horse barn 240 feet by 40 feet ~ above ~

THE great Ohio prison farm, situated at the edge of the small city of London, twenty-five miles west of Columbus, the state capital, represents what can be done in the way of fast, safe, economical and practical construction work by means of cement. The great farm of 2200 acres is the largest dormitory prison in the world.

Under the general direction of Superintendent W. F. Amrine, who has spent twenty-five years in penal work, and the supervision of J. C. Rhoades, general construction superintendent, the farm which twenty years ago was a great mass of blue grass and woods is now one of the greatest and most efficient penal institutions in the world—and the beginning is just completed. Cement—ALPHA CEMENT to a great extent—has played a leading role in the building of the structures on the farm. The farm was purchased by the State of Ohio during the administration of Governor James M. Cox, and is designed as a correctional institution. It has demonstrated its real usefulness to the state and the record of the farm is one long story of financial saving and of benefit to humankind.

Construction Superintendent Rhoades has figures to show that in the three main buildings of the administration-dormitory group, 142,000 cubic feet of concrete have been used to date. The buildings include 154,000 square feet of floor space with one new dormitory wing of three stories to be built this year—279 feet in length and 72 feet in width.

The total cubic feet of concrete listed does not include the great dairy barn, the horse barn, power house (142 x 108 x 45 feet), the proposed new wing, the foundations for many small buildings, the miles of sidewalk and road construction, fence posts, disposal plant, sewer tile, tunnels, building footings, sills, and other work in and about the great farm.

Asked why so much concrete is used, Mr. Rhoades said:

"It is fireproof, cheaper than other materials, more workable, makes permanent construction practicable and worth while, is proof against weather under all conditions existing in this section, is easier to handle, makes faster work possible and it saves money, time and labor."

The fireproof qualities of cement construction are perhaps as important as any, the farm officials say, because of the real danger in caring for a thousand men. Construction that is proof against fire of any kind is absolutely necessary in prison buildings, large and small, and cement makes this cheap and easy, the prison men state.

Cleanliness also is a prime requirement and cement makes it practicable to keep the London prison farm buildings as clean as is humanly possible.

In comparing costs of concrete and other types of prison farm construction, it is pointed out that in the construction of a basement at the London prison farm, the approximate cost with concrete was $300.00, and the estimated cost with another type of construction was placed at $1200.00. It is also pointed out that the basement was built with cement in much less time than would have been required with the other type of construction.

A great quantity of cement has also gone into the precast work that is used in place of stone, the units being cast on the ground. Some stone was used in the construction of the first one of the administration-dormitory group which for some time was left unfinished. When work was resumed, the stone was put aside and all proposed stone pieces were precast on the ground.

The great farm is probably one of the best tiled farms in the country and most of the large-size tile is made of concrete.

The great tunnels between the buildings are all made of concrete, the concrete being poured around a frame of $1^1/_2$-inch angle iron, reinforced with rods. This type of construction

PRISON FARM SOLVES MANY PROBLEMS

By Austin K. Chenoweth

View of second floor of one wing of dormitory building group. All floors of concrete ~ *at left* ~

"Twin" concrete bridge at junction of two streams ~ *below* ~

Concrete bridge on main road to farm ~ *above* ~

View showing one of the buildings in process of construction during winter months. All concrete for this unit poured during sub-freezing weather ~ *at left* ~

permits the building of other structures on top of the pipe and tunnel lines.

The great columns in the buildings are made of reinforced concrete and the greater portion of the miles of driveway on the farm is paved with concrete and almost all of the walks and steps are of concrete. The sub-foundation for the roads that are paved with other material, fence posts, shower baths, cisterns and the great cesspools are all made of concrete.

By careful planning, a great amount of winter concrete work has been accomplished at the London prison farm, all entirely successful and providing work in the off season for farm labor and giving the officials an opportunity to get some of the needed building program under way for the larger program of the warm weather season.

One of the finest pieces of cement and steel construction jobs on the farm is the recently completed cell-block or quarantine and discipline section of one of the main dormitory structures. This section contains 72 cells, and all so solidly enclosed in concrete that it is believed to be almost out of the question for any prisoner to escape.

Many bridges are artistic, many are historic and still others are extremely necessary, but a combination of all good points in bridges is to be found in at least two of the fine new concrete bridges recently built on the farm. The largest of the two bridges spans the small stream of Oak Run on the main approach to the administration building.

It is a very fine specimen of craftsmanship, notwithstanding that all labor on the bridge was done by inmates. The bridge has a length of 67 feet, is $22^1/_2$ feet wide, with four tapering wings, 15 feet long and 12 feet deep, battered to 18 inches. Four posts, three feet by four inches each, grace the structure, connected with a 16-inch wall.

The other bridge, frequently called the "Twin," is at the junction of Oak Run and another small stream, about one-half mile from the bridge over the creek on the main highway approach. This bridge provides immediate access to several hundred acres of fine land, greatly facilitating the movement of farm machinery and teams.

The "Twin" bridges are identical in construction so far as the general scheme goes as to beams, floor, etc., although there is one foot difference in their length. The bridge spanning the branch is 17 feet, 5 inches in length, 18 feet in width, with 10-inch floor and four 14-foot beams. This bridge has three wings, two on the west side, upstream, the other at the southeast corner. These wings taper; average about 12 feet in length, 13 feet deep, 30 inches at the base, battered to 16 inches. A retaining and connecting wall, 20 feet, 7 inches long, extends from one corner to the other bridge, the base being 30 inches, battered to 18 inches, with an additional 10 inch rise, 8 inches thick, as a gravel retainer. This retainer extends on through to the end of both bridges, protecting the roadway. The abutments of both bridges are 30 inches at the base, battered to 18 inches, and both have a three-inch pipe railing tied into concrete posts measuring 16 x 18 x 50 inches. There are two wings on the north side of the bridges, one being 9 feet, 8 inches at one corner and 11 feet, 8 inches at the other. Another wing, 9 feet, 6 inches long, connecting with a retaining wall extending downstream 61 feet, is $5^1/_2$ feet above the water level, extends 5 feet under the ground, and is 24 inches at the base battered to 12 inches.

The great farm is being steadily transformed from the wilderness of twelve years ago to one of the finest state institutions in America. Many of the inmates who have shown a desire to improve their time have been given valuable instruction. A number have earned their parole and are today making their way in the world.

The Vegetable Cave and underground Reservoir are concealed by this unique garden setting

The Pergola in the west garden. Walls, floors and furniture are of reinforced Cement faced with stones

Center illustration shows a portion of wall for the Reservoir in the front yard of the Sparling Farm

Below is shown the walk leading to the west garden. The pedestal is of Cement with stone inlay

CEMENT ENABLES SPARLING TO USE WHAT OTHERS THROW AWAY

By George R. Harrison

THE vegetable cave and the underground reservoir for water storage on many a farm are, as a rule, unsightly objects in the farm landscape. The mounds of earth that stand up over these excavations may become weed harbors to say the least against them; but when the caves and reservoirs are properly planned, built and maintained they become ornamental as well as useful as is shown on the farm of Fred L. Sparling near Omaha, Nebraska.

Sparling's only practical location for the reservoir was in one corner of the front yard, for that provided the most fall for the supply pipes leading over the premises. "I hesitated a long time before placing the reservoir there, or until one day it occurred to me that the reservoir could be made to appear as a big flower bed," explained Sparling.

Above is a view of the Sparling reservoir as it appears, and some of its front yard environment. The reservoir is walled about with concrete into the face of which are embedded stones that were picked up about the country. Over the inner expanse of circle is a wonderful flower bed. This plan of construction for the reservoir inspired Sparling to build all kinds of other beautiful things about the place.

Another picture shows what Sparling calls his west garden in process of construction, though most of the work is finished. Walls, floors and furniture for the pergola are of reinforced concrete faced with the stones, or with waste marble that Sparling found in junk heaps. Mrs. Sparling is an able assistant to her husband, and is shown mixing a small batch of the concrete to be used in inlaid stone work.

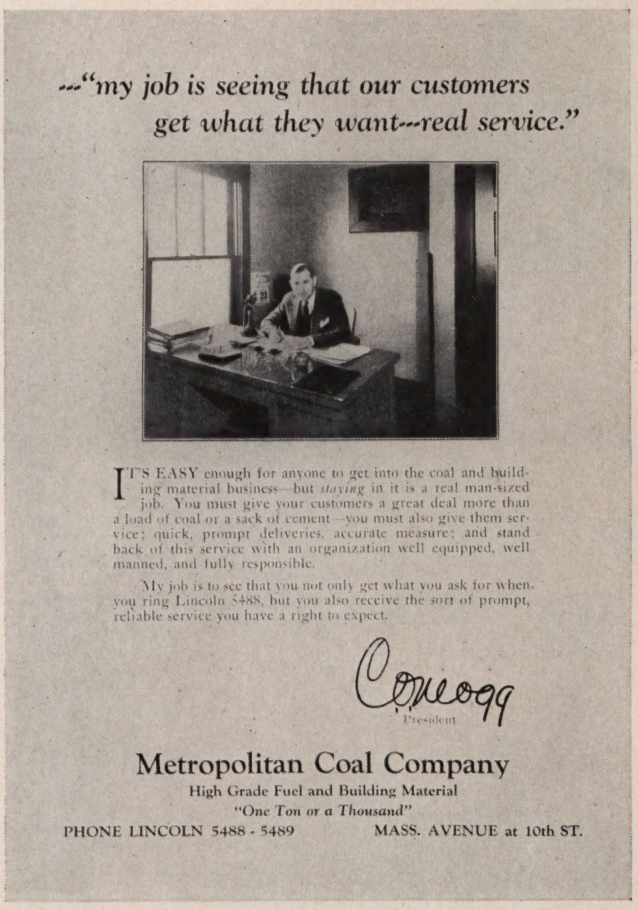
Such work with cement and stone has transformed the Sparling farm premises from their former commonplace appearance into a scene of wonderful refinement. Now the cave and even its entrance are hidden by a scene from Old Japan. A pergoda, a mill, a castle, moats, fountains, flowers, all assembled by inlaying concrete with common stones, combine to make this back yard something out of the ordinary. And, all the work has been done during the spare hours from regular farm labors.

"This work we have done does not mean a lot of money outlay," Mr. Sparling explains, "for about the only material we had to buy was the cement. The stone was picked up, and besides we have used a lot of stuff that other folks threw away." And to prove his point he led the way to a pergola, the floor of which was of broken slabs of marble found in a city dump.

Among ALPHA Dealers

An Illustrated Leaflet Puts Across the Story of "Real Service"

A WELL planned, profusely illustrated 4-page leaflet, 7¼ by 10 inches in size, a reproduction of which is shown below, was used effectively by the Metropolitan Coal Company, Indianapolis, Ind., in selling its products, service and personnel to its customers and prospects.



The first page which is shown here carries a picture of C. O. Mogg, President of the Metropolitan Coal Company, at his desk ready for business and the following pertinent message immediately above it:

... "My job is seeing that our customers get what they want... real service."

The body of the talk on the front page reads:

"It's EASY enough for anyone to get into the coal and building material business—but *staying* in it is a real man-sized job. You must give your customers a great deal more than a load of coal or a sack of cement—you must also give them service; quick, prompt deliveries, accurate measure; and stand back of this service with an organization well equipped, well manned and fully responsible.

"My job is to see that you not only get what you ask for when you ring Lincoln 5488 but you also receive the sort of prompt, reliable service you have a right to expect."

The second and third pages are used as a double page spread, with the copy and illustrations stressing their modern coal handling equipment; repair shop where their twelve trucks are overhauled regularly and repainted once a year; accurate and speedy weighing machine; a flexible delivery service of small trucks for the quick handling of small orders of coal and building materials and large trucks for large orders and their delivery personnel, about which it is said:

"They may not be the best looking bunch in the world but they are the *most efficient.* We have trained them to know their business. And they are probably the most presentable drivers, too, for they keep their trucks clean and appear in clean uniforms every Monday morning."

On the fourth page an interior view of a cement warehouse is shown, together with a brief talk on the building materials handled.

The leaflet was mailed to a list of approximately 2500 names and is something a "little different," embodying the personal touch and has increased their business in proportion. The results are well summarized in the following excerpt from a letter written by President C. O. Mogg:

"The Metropolitan Coal Company is getting better known throughout the trade of both steam and domestic coal and building material. It is getting easier to sell our product than it was three years ago when we would be told upon calling on a prospect that they never heard of the company before. We believe that this pamphlet has overcome 95% of this difficulty."

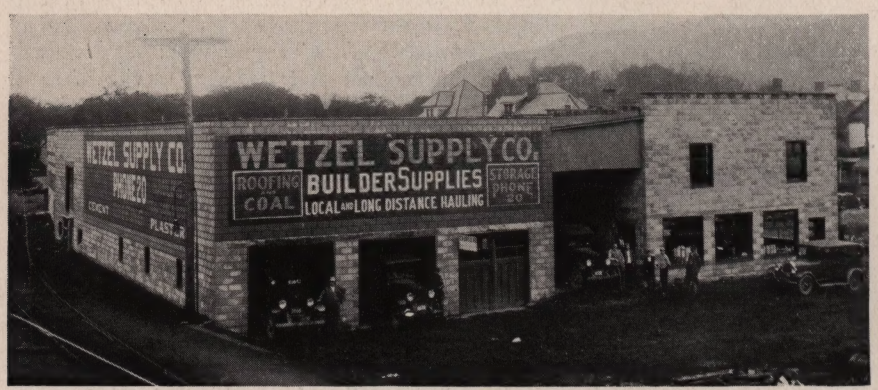
Direct mail, when carefully planned and mailed to a well compiled list of customers and prospective customers, is one of the best avenues of advertising for a retail merchant.

Structural Soundness and Economy Embodied in Office and Warehouse of Wetzel Supply Co.

"OUR warehouse, 150 feet by 60 feet, and office building, 40 feet by 30 feet, each two-story buildings, were erected of cement blocks. The blocks were made of ALPHA CEMENT and they are fine. We have been using ALPHA CEMENT in our block plant and handling it as building supply dealers for twenty-five years and it is the best all-round cement on the market."

So wrote Mr. W. H. Smith, Vice-President and General Manager of the Wetzel Supply Company, New Martinsville, W. Va., when he sent us the views shown on this and the preceding page. It will be noticed that the railroad siding enables direct unloading into the warehouse. Planks are laid from the car to the warehouse door.

The Wetzel Supply Company has used to good advantage



the exterior wall surface of the warehouse as a billboard, informing customers and prospective customers of the different building materials carried in stock. The power of suggestion often leads to several purchases where only one was contemplated.

Reserve Your 1931 ALPHA CEMENT Calendar Now

THE large 13-sheet ALPHA CEMENT calendar which shows three months at a glance, will be mailed only upon request. While it may seem a little early to make sure of your 1931 calendar at this time, the mails will be crowded with calendar requests during the holidays and you would do well to make your reservation now.

The calendar is printed in two colors and is 18 by 24 inches in size. Thousands of comments come to us every year from building supply dealers, architects, contractors, cement product plants, industrial concerns and home owners, telling of the usefulness of this large attractive calendar. On the thirteenth sheet, calendars for the years 1930, 1931 and 1932 appear.

Mail the form below to us and one of the 1931 calendars will be sent to you early in December. Be sure you print your full name, street address, town and state plainly.

Service Department
Alpha Portland Cement Company
15 South Third Street
Easton, Pa.

Put me down for one of your 13-sheet, big-figure calendars.

Name.....

Street Address.....

Town.....State.....

(Reserve your 1931 calendar today)

A Personal Greeting Card

DURING the Christmas and New Year holiday season most every one receives many cards that are so typical of the average greeting that only a fleeting impression is made. But when an out-of-the-ordinary card, one that stands out from the usual run, arrives in the mail the impression created of the sender is strongly enhanced and lingers for a long time.

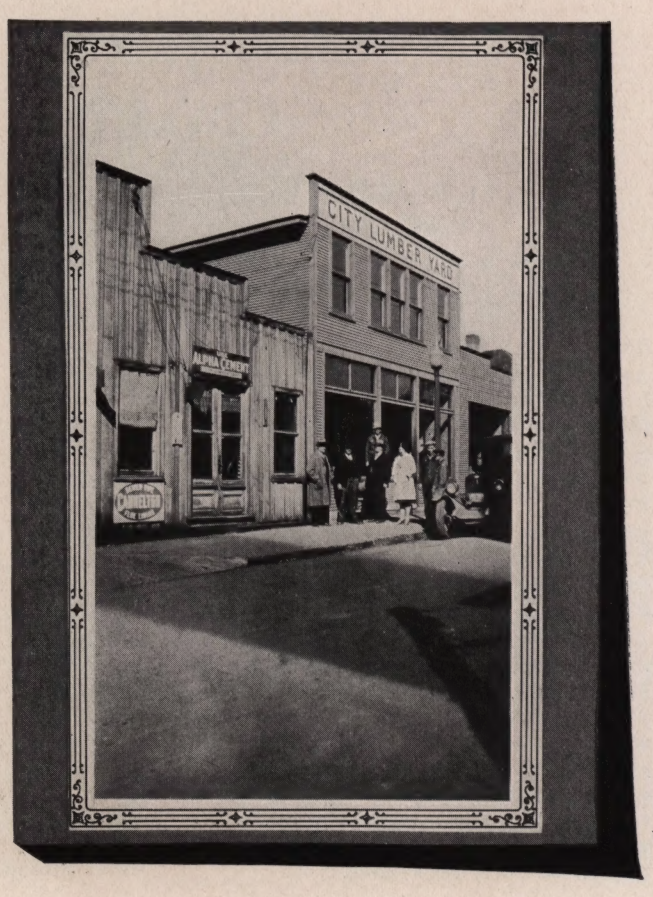
The unique and distinctive always command attention and the wise merchant endeavors to make that attention favorable to his business or to himself. How well the City Lumber Yard of Princeton, Ky., recognized the value of the unusual is shown in the holiday greeting card they used during the Christmas season of 1929.

The card was of red color with the printing in black ink. The card was folded once and on the front page was pasted a snapshot of their store building, as shown in the illustration below. On the third inside page appears the following appropriate sentiment:

THE SEASON'S GREETING

MAY THE COMING TWELVE MONTHS BRING
YOU HAPPINESS AND PROSPERITY
AND OUR PLEASANT RELATIONS OF THE PAST
BECOME EVEN MORE FRIENDLY
IN THE FUTURE

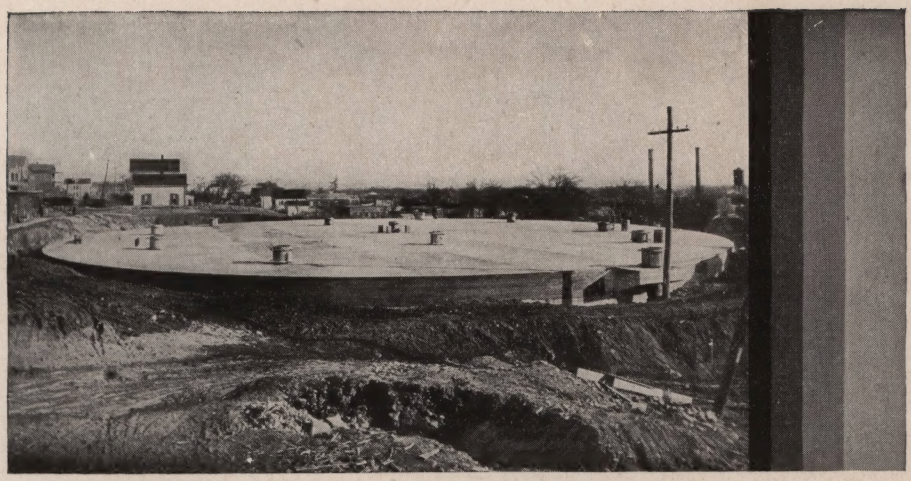
CITY LUMBER YARD
E. YOUNG, Prop. R. E. YOUNG, Mgr.



(Right) Roof ready for covering of three feet of earth

(Photographs taken in 1917)

(Below) Inside of covered reinforced concrete reservoir



2,300,000 GALLON RESERVOIR

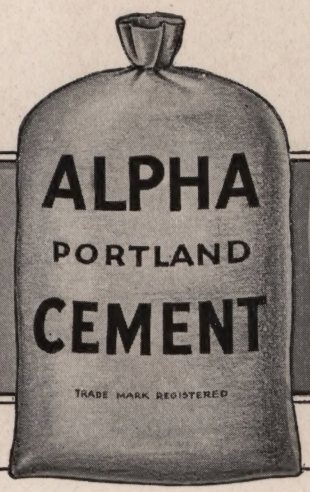
CONSTRUCTED IN 1917 OF ALPHA CEMENT CONCRETE

No Waterproofing Used

How WELL the F. L. Dillon Construction Company, Lodi, N. J., followed the principles of dense, watertight concrete in the construction in 1917 of the underground concrete reservoir illustrated here, is evidenced by the fact that after thirteen years of use the reservoir is as watertight as when completed. No leaks developed and there are no indications of any to be expected.

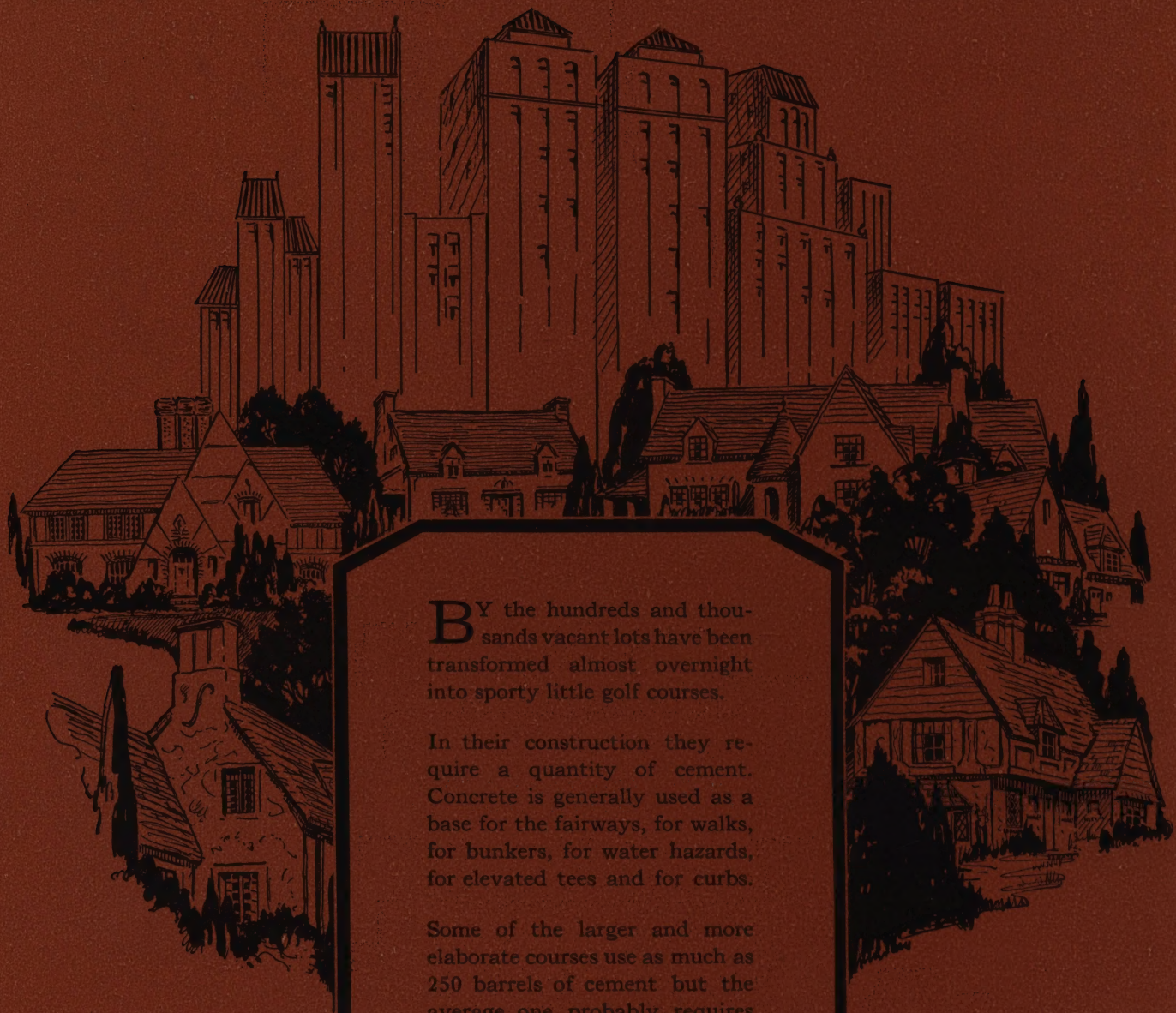
This concrete reservoir is proof that proper design, good workmanship and standard ALPHA PORTLAND CEMENT will give the user the results desired.

Helpful literature on watertight concrete, high early strength concrete and general cement work free upon request.



ALPHA PORTLAND CEMENT COMPANY

BALTIMORE - BATTLE CREEK, MICH. - BIRMINGHAM, ALA. - BOSTON - CHICAGO
EASTON, PA. - IRONTON, OHIO - NEW YORK - PHILADELPHIA - PITTSBURGH - ST. LOUIS



BY the hundreds and thousands vacant lots have been transformed almost overnight into sporty little golf courses.

In their construction they require a quantity of cement. Concrete is generally used as a base for the fairways, for walks, for bunkers, for water hazards, for elevated tees and for curbs.

Some of the larger and more elaborate courses use as much as 250 barrels of cement but the average one probably requires a minimum of twenty-five barrels.

The uses of concrete continue to grow.

The* ALPHA *Dealer is the Cement Service Man of Your Community—

- CALL ON HIM -